

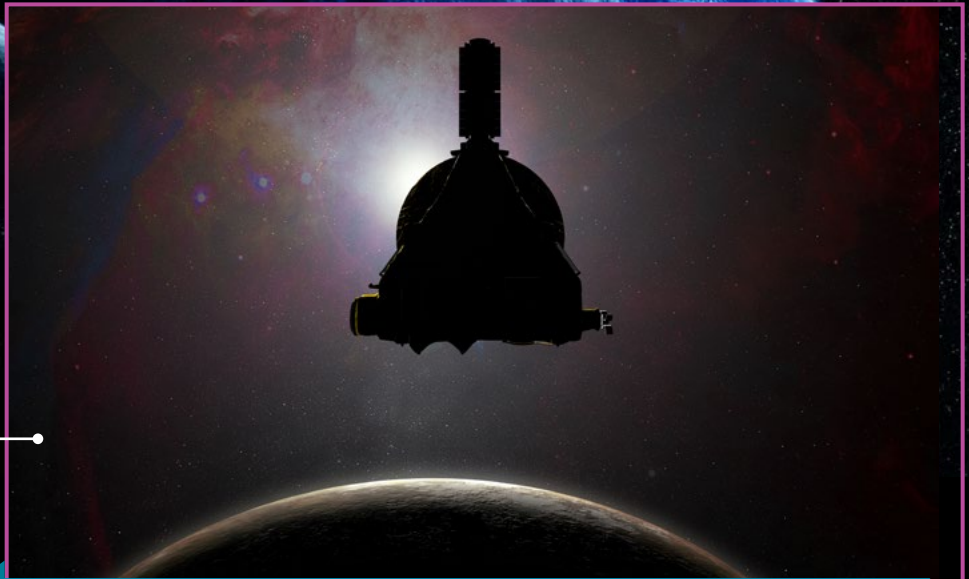
THE

ISSUE 103 SPRING 2015

LOWELL OBSERVER

THE QUARTERLY NEWSLETTER OF LOWELL OBSERVATORY EXPANDING OUR UNIVERSE

Artist's concept of the *New Horizons* spacecraft encountering Pluto and its largest moon, Charon (foreground), in July 2015. The craft's miniature cameras, radio science experiment, ultraviolet and infrared spectrometers and space plasma experiments will characterize the global geology and geomorphology of Pluto and Charon, map their surface compositions and temperatures, and examine Pluto's atmosphere in detail. Credit: NASA/ Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute/ Steve Gribben/Alex Parker



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Pluto: The Next Chapter

by Will Grundy

NASA's *New Horizons* spacecraft is rapidly closing in on the Pluto system, speeding across another 5.5 million miles of the outer solar system each week. The long-awaited 6000 mile closest approach to Pluto is coming up July 14, but the spacecraft is already well into its year-long scientific encounter. It has been collecting data on the planet's plasma and dust environment, along with frequent black and white images of the system. The images are to ensure *New Horizons* remains on course and also to search for potential hazards that could trigger flying one of several alternate trajectories. The January and February images already show three of Pluto's moons: Charon, Nix, and Hydra. They keep getting sharper and sharper as the distance closes, in a slow and steady opening of the door to reveal Pluto and its satellite system in exquisite detail.

The first color images were taken in April. As leader of one of four *New Horizons* science theme teams, these observations are especially interesting to me. The Composition theme team, consisting of about a dozen scientists from

all over the country, aims to understand what the bodies in the system are made of and how those materials interact and shape their interiors and surfaces. Color and infrared spectral observations are our primary tools. Although Pluto and Charon will just be point sources in the still-distant April observations, they will be our team's first composition-related data from *New Horizons* in the Pluto system.

Along with the other three science theme teams (focused on atmospheres, geology, and the plasma environment) we are all working hard to ensure everything is ready for the historic encounter. Immediately following launch in 2006, our attention was on planning the 2007 Jupiter flyby, followed by the

continued on page 4

New Discovery Channel Commercial Features Evgenya Shkolnik

See page 4 for more!



DIRECTOR'S UPDATE

by Jeffrey Hall

This newsletter seems especially full of reasons Lowell is such a fine place. Below, you'll see news about the Alvan Clark telescope, which will soon be back in service. It is going to be magnificent, thanks to Ralph Nye and the entire restoration team. Our feature article is about Pluto, and by the time you read the next *Observer*, *New Horizons* will have made its flyby of Pluto, and we'll be getting our first of what will be stunning images of Pluto and its moons. We'll have a celebration of all things Pluto at our Annual Gala on June 13 — I hope you'll join us and support Lowell through your ticket. You'll hear the latest directly from our astronomers Will Grundy and Henry Roe about the world we discovered here 85 years ago. If you can't make the

Gala, stop by our Visitor Center and see the fine new Pluto exhibit Samantha Thompson has created, made possible by an exceptionally generous gift from Ralph and Barbara Rockow. I'm also pleased to welcome Lisa Actor, our new Deputy Director for Development, to the team. Lisa comes to us from Westminster College in Utah; she has hit the ground running and is eager to bring our story to all of you in new and interesting ways. Finally, look over *The Observer* itself. Sarah Conant has given it a nice makeover that matches our new website at www.lowell.edu, which rolled out on February 1. It is an interesting and exciting year, and we're glad to have you on the journey of discovery with us. 📧



TRUSTEE'S UPDATE

by W. Lowell Putnam

As you can see in this newsletter, there is growing excitement about the *New Horizons* approach to Pluto. For the observatory this represents both our history and our current science. There are very few, if any, research institutions that participated in groundbreaking research 100 years ago and are still on the cutting edge of that same research. But that

is something the observatory has done often in the past, and continues to do so now. These continue to be exciting and interesting times.

Also in this newsletter you will see examples of the degree of interest and support that we are fortunate to receive from so many of our friends and "family". Whether it is support for research or exhibits, the hours of efforts in cataloging files or preparing records for archiving, or the extraordinary work that has gone into renovating the Clark, we are very lucky and grateful for the "time, talent and treasure" that helps us continue the vision and mission of our founder.

I think Percival would be very pleased and honored. 📧

Thank You Kay!

After three years as Deputy Director for Operations Kay McConagha left Lowell Observatory in March. She is moving to New England to be Chief Administrative Officer for the companies operated by Robert Ballard, who is best known for finding the wreck of the *Titanic*. We thank Kay for her tireless efforts over the past three years keeping our financial house in order and wish her all the best in her new position.



Clark Renovation Nears Completion

We are pleased to announce that work on the Clark Telescope is winding down and the instrument will soon be back in operation. Ralph Nye and his crew of Peter Rosenthal, Jeff Gehring, Dave Shuck, Glenn Hill, and Rich Oliver have painstakingly repaired, rebuilt, or refinished virtually every part of the telescope and dome. The result is a facility that looks and performs better than ever! On May 16 we will hold a private reopening celebration for donors to the renovation project. The public reopening will follow soon afterward; stay tuned to our website and social media outlets for more details. In addition to hosting these reopening ceremonies, we are also producing a documentary about the renovation project and a coffee table book highlighting the history of the Clark, from its construction in the 19th century to renovation in the 21st. We expect both of these to be completed by the end of this year.

Lowell brought in Southwest Industrial Rigging to lift parts of the Clark back into the dome piece by piece. The mount assembly, including three counterweights, weighs 11,000 pounds!



Sharing Pluto with the Public


by Samantha Christensen

Something very special is on the horizon. We will soon get our first close-up view of a Kuiper belt object – one that happens to have deep ties to Lowell Observatory. More than 100 years ago, Percival Lowell predicted the existence of a celestial body on the outskirts of the solar system. Clyde Tombaugh confirmed the presence of such an object with his discovery of Pluto at Lowell Observatory in 1930. Significant progress has been made in the characterization of Pluto since its discovery but much remains to be learned. We are unable to get detailed information about Pluto's surface from Earth-based studies because Pluto is relatively small and very far away. In order for us to conduct comprehensive studies, we must somehow close the gap – cue the *New Horizon* Mission to Pluto. The *New*

Horizons spacecraft has been making its way out to Pluto for the last nine years. Its closest approach to Pluto will occur on July 14, 2015 when the spacecraft will pass within 10,000 miles of the distant Kuiper belt object. Images captured during the flyby will provide us with stunning views of Pluto's surface. An exciting and long-awaited new chapter is about to be added to the story of Pluto.

The Pluto narrative is a fundamental part of Lowell's outreach program. It is a story we share with our visitors on a daily basis. The *New Horizons* flyby will make this captivating tale even more interesting. Soon we will be able to share detailed images of Pluto's surface with our visitors. We will also be able to tell them about the composition of its surface thanks in part to research conducted by Lowell

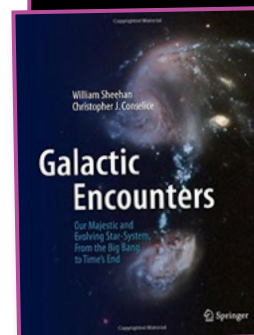
A homemade *New Horizons* model is held in front of the sign that shows visitors where to go for the Pluto Tour, which is offered daily. This tour guides guests through the story of Pluto's discovery, starting in the Historic Rotunda Museum and ending in the Pluto Discovery Telescope dome.

Observatory astronomer and *New Horizons* team member Dr. Will Grundy. The observatory's connection to *New Horizons* makes Lowell's Pluto story even more compelling and also emphasizes the fact that we are a modern research institution with a rich history. We look forward to sharing the next chapter of the Pluto story with our visitors. 

Bill Sheehan Publishes New Book

History scholar and Lowell affiliate Bill Sheehan has co-authored a new book, *Galactic Encounters: Our Majestic and Evolving Star-System, from the Big Bang to Time's End*. This book "tells the story of how astronomers have pieced

together what is known about the vast and complicated systems of stars and dust known as galaxies".



2015 Summer Camps

Registration is now open for Lowell Observatory Camps for Kids (LOCKs) summer programs. Camps are available for students entering grades 1 through 9 in the fall. Topics include The Solar System (grades 1-2), Galaxies (grades 3-4), Life on Other Worlds (grades 5-6), and Introduction to Astronomy (grades 7-9). Tuition is \$200 for members and \$225 for non-members. Scholarships are available. Please visit our website www.lowell.edu/outreach/elementary-camp for more information.

Children will be able to perform hands-on science experiments to learn the elements of STEM: Science, Engineering, Technology, and Math.



PLUTO: THE NEXT CHAPTER
continued from page 1



Will Grundy is a planetary scientist specializing in Pluto and other outer solar system bodies. Dr. Grundy serves as a Co-Investigator of the New Horizons mission. He is seen here at the opening of *Pluto at 85: From Discovery to New Horizons*.

core of the Pluto encounter, and then various contingency plans. This planning continues even today for the more distant approach and departure sequences, like laying down track ahead of a moving train. The theme teams have also invested considerable effort in developing customized software to enable us to quickly process and make sense of our data, following transmission to Earth. We are doing a series of intensive practice sessions where we assemble the whole science team, receive fake data as if it had just been transmitted from the spacecraft, and quickly process it and work together to develop scientific interpretations and figure out how to communicate results to the public. The time pressure of the 24 hour news cycle is very different from the more cautious and deliberative work environment that scientists are accustomed to, so it is crucial to practice this thoroughly before the world's attention is on us.

The Pluto system is sure to hold many fascinating surprises for humanity. Stunning discoveries have been made whenever a new planet was explored up

close by a spacecraft for the first time, and with Pluto, it is not just the first exploration of the planet, but the first of a whole new class of icy, Kuiper belt planets. Pluto's surface composition is already known to include nitrogen, methane, ethane, and carbon monoxide. On Earth these chemicals are all gases, but at the extreme cold of Pluto's surface, around 40 degrees above absolute zero (minus 390 Fahrenheit), they freeze into exotic cryogenic ices. We have been freezing and studying these ices in the laboratory for years, but we don't yet know what alien landforms they create by sublimating and recondensing on Pluto's surface over multi-decadal seasonal time scales. ☺



Welcome Lisa Actor

On March 31 Lisa Actor joined the Lowell staff as our new Deputy Director for Development.

Lisa brings a solid background in fundraising, including the past 16 years on the development staff at Westminster College in Salt Lake City. She took on several roles at Westminster, including Director of Foundation and Government Relations, Director of Gift Planning, Development Director, and Associate Vice President for Institutional Advancement. Lisa earned a B.S. in biology from the University of the South in Tennessee and worked for the National Oceanic & Atmospheric Administration (NOAA) for five years, serving as deck officer/survey party chief on a ship charting the waters of Alaska and Hawaii. Lisa has also written a children's book, *Rebel Raiders*. At Lowell, Lisa will oversee our fundraising and affiliated membership efforts.

Discovery Channel Features Evgenya Shkolnik and DCT

All you Discovery Channel fans be on the lookout. Discovery has created a series of brand campaign spots to celebrate the company's 30th anniversary, focused on the science they promote. Discovery chose Lowell Observatory to be part of this exciting project and developed a segment featuring DCT and Dr. Evgenya Shkolnik. We spent the early part of March scouting and filming the locations for the shoot and filming took two full days with a crew of nearly 20 people. Some of the imagery includes time-lapse videos of DCT, historic items in our archives, and stunning shots of the night sky. It was a grueling two days, but we had great help from Curator Samantha Thompson, Archivist Lauren Amundson, and the DCT staff, who helped to provide guidance and care to the equipment and artifacts being used. We hope you enjoy it. Click [here](#) to watch the video.



Dr. Shkolnik prepares to be interviewed during filming of the Discovery Channel's new commercial highlighting Lowell's Discovery Channel Telescope.

More than 100 guests attended the VIP preview of *Pluto at 85: From Discovery to New Horizons*. This exhibit features artifacts from the observatory's collections and will be on display in the Steele Visitor Center through the end of 2015.

by Hannah Graves

On March 13, 2015 we opened our newest exhibit, *Pluto at 85: From Discovery to New Horizons*. This was the perfect day for such an event, since March 13 is Percival Lowell's birthday and the anniversary of the announcement of Pluto's discovery. In attendance were members of the Friends of Lowell at the \$100 and higher level, invited for a free VIP preview. Guests viewed the exhibit at their own pace with a brief interlude of speeches given by Flagstaff Mayor Jerry Nabours, Lowell Director Jeffrey Hall, and Mr. Ralph Rockow, founder and CEO of Exodyne, Inc.

Pluto at 85 chronicles the story of Pluto, from its discovery here at Lowell through current research efforts. Displayed items include original correspondence, calculations, photographic glass plates, and assorted memorabilia from the Lowell archives. More will be added to the exhibit as we receive new images from the *New Horizon's* mission to Pluto. "This was an exhibit that could only be created in Flagstaff," said Lowell Curator Samantha Thompson.

Exodyne sponsored *Pluto at 85*, which was entirely conceived and created here at the observatory. Rockow's accomplishments include work on the design and development of the LEM Descent Engine on Apollo 13. At the event,

Rockows Help Bring "Pluto at 85" to Life



he and his wife, Barbara, were honored with an original copy of the circular announcing Pluto's discovery.

The VIP preview is a benefit to Primary Level members, who receive an invitation to one special event each year. It included hors d'oeuvres provided by Taverna Greek Grill and a cash bar. Guests mingled with and asked questions of Lowell astronomers Drs. Jeff Hall, Henry Roe, Otto Franz, and a co-investigator on the *New Horizons* project Will Grundy. Also in attendance were Curator Samantha Thompson and astronomer James Christy, who discovered Pluto's largest moon Charon in 1978 while working at the U.S. Naval Observatory. Everyone left having learned more about this distant world from the institution that discovered it. ☺

Ralph and Barbara Rockow stand in front of the acknowledgment panel near the entrance of the *Pluto at 85* exhibit. The Rockows are holding an original copy of the March 13, 1930 Lowell Observatory Observation Circular announcing Pluto's discovery.



Titan Monitor Upgrade

A \$136,000 gift from the Robert Martin Ayers Sciences Fund, along with a \$50,000 matching gift from the John and Maureen Hendricks Charitable Foundation, is enabling a significant upgrade to the Titan Monitor. This 0.5-m robotic telescope is located on Mars Hill and is designed to study weather on Saturn's moon Titan. The new infrared camera and prisms for spectroscopy will make the Titan Monitor significantly more sensitive to Titan's clouds, as well as enable additional projects when Titan is not being observed.

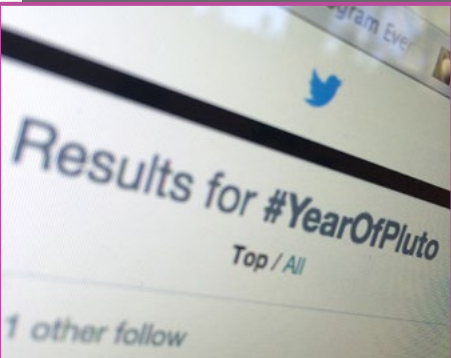
Princeton Instrument's NIRvana:640 infrared camera, one of the upgrades made possible by recent grants to astronomer Henry Roe's Titan Monitor Project. Background: Titan (NASA/JPL/SSI)

PLUTO and BEYOND

On June 13th, 2015 we will be hosting our 4th Annual Gala, *Pluto and Beyond*, to be held at the High Country Conference Center here in Flagstaff. We invite you to be a part of this event!

The black-tie optional Gala begins at 5:30 p.m. with the Kuiper VIP Champagne and Cocktail Reception in the 1899 Bar. The doors to the High Country Conference Center will open at 6:00 p.m. to a non-hosted bar and a gourmet sit-down dinner at 7:30 p.m. The evening's program will include festive music provided by Mogollon and special presentations recognizing the discovery of Pluto, the significance of the *New Horizons* Mission and what it means for the future of Pluto. We will conclude the evening with our popular Live and Silent Auction. Please contact Mica Gratton 928-255-0229 (mica@lowell.edu) for more information.

Last year's Speaker Series with special guest astronaut Mark Kelly was a hit!



To Donate:

www.lowell.edu/donate/donate-to-lowell/

or contact Hannah Graves at hgraves@lowell.edu

The Year Of Pluto is Upon Us!

Celebrate the Year of Pluto by supporting our astronomers, and inspiring future ones, in exploring our solar system and beyond.

From the discovery of Pluto in 1930 to the *New Horizons* flyby mission, Lowell astronomers have been contributing to our understanding of the solar system and the universe beyond. Thanks to a generous challenge gift from our Friends, we are asking you to help us reach our goal of \$250,000. Your support will allow us to continue our mission of astronomical research and public education in astronomy, which began 120 years ago here on Mars Hill.

Something Looks Different...

The *Lowell Observer* has received a makeover! We have updated the newsletter's look to reflect the redesign of our website. Check out www.lowell.edu to see for yourself!

Recent Publications



Keep up with our astronomers' research by reading their recent publications. Below is just one example of their work. See our website for more.

Knight, Matthew M. ; Schleicher, David G. (2015). Observations of Comet ISON (C/2012 S1) from Lowell Observatory. *The Astronomical Journal*, Volume 149, Issue 1, article id. 19

Image: Neugent/Massey/Lowell Obs./NSF

See our website: www.lowell.edu/research/recent-publications for more publications



Archives Volunteer Karen Kitt and Archivist Lauren Amundson stand in front of the Carl Lampland correspondence files. Karen holds a letter signed by future President Franklin D. Roosevelt.

Exploring the Carl Lampland Files

by Karen Kitt

Carl Otto Lampland, one of Lowell Observatory's unheralded astronomers, had a long history on Mars Hill. Hired by Percival Lowell in 1902, Carl would remain at Lowell until his death in 1951. For the past year I have been reviewing 21 boxes of Lampland's correspondence and updating Lowell Observatory's archive database with the subject matter of each letter.

Carl was an astronomer, inventor and jack-of-all-trades. He designed, constructed and maintained astronomical cameras, telescopes, thermocouples and other instruments that were used in Percival Lowell's studies of Mars, Clyde Tombaugh's search for "Planet X" and V.M. Slipher's discovery of the expanding nature of the universe. He also did his own nebulae and

planetary research and eagerly assisted other astronomers in their work. The reason he is virtually unknown is that he rarely published his work.

Although much of the correspondence I have reviewed involves the mundane, day-to-day operation of the observatory, there have also been some remarkable finds. During the almost 50 years Dr. Lampland worked at Lowell there were significant world events that had an effect on the observatory: both World Wars, the Great Depression and the Bolshevik Revolution, to name a few. I have found references to deprivation and heartache these events caused.

In 1919 Carl was inquiring whether a publication, *The American Practical*

Navigator, was available at the U.S. Department of the Navy. He sent his inquiry to Senator Henry Ashurst (one of Arizona's first two senators) who forwarded it to the Navy. The then Assistant Secretary of the Navy, Franklin Delano Roosevelt, replied that due to the war it was not available; his signature is bold and almost presidential.

In 1925 Carl received a letter with a petition signed by many notable Russian expats including the composer Sergei Rachmaninoff and the famous Bolshoi choreographer Mikhail Fokine, imploring scientific and cultural institutions in the West to help Russian artists and scientists who were unable to make a living under the Bolshevik regime. In many cases the Russian intelligentsia was starving due to total neglect of the arts and sciences by the Bolsheviks, or they were shipped off to the gulags.

On the lighter side, there is Carl's voluminous correspondence with Constance Lowell, Percival's wife, after Percival's death. It is possible that Carl was the only one on Mars Hill to have a cordial relationship with Constance considering the dispute over Dr. Lowell's estate that lasted many years. Her observations and gossip are, at times, very entertaining.

I still have seven boxes to review and I wonder what surprises lie within 'P' through 'Z'. 🍷

From Slipher Basement to Putnam Collection Center

Volunteers Judy Leary and Lori Lombardi have assisted with the monumental task of preparing collections for the move from the Slipher Building basement to the Putnam Collection Center. They inspect the boxes and wrap them in plastic before we put them in our walk-in freezer, which kills any insect infestations. We recently finished moving the papers of former astronomer Henry Giclas and are now tackling the papers of astronomer and Director Emeritus Robert Millis.

Lori Lombardi stands in front of the freezer with just a few of the many boxes she and Judy Leary have prepared.



ISSUE 103 SPRING 2015
THE LOWELL OBSERVER
UPCOMING SPECIAL EVENTS

OPEN YEAR-ROUND

Monday - Saturday: 10:00 a.m. - 10:00 p.m.

Sunday: 10:00 a.m. - 5:00 p.m.

Extended Hours: Sunday, May 24 | 10:00 a.m. - 10:00 p.m.

RECURRING EVENTS

2nd Friday Science Night | **MAY 8** (Chemistry I), **JUNE 12** (Chemistry II),
JULY 10 (Electricity and Magnetism I) | Shows at 6, 7, and 8 p.m.

Stars on Mars Hill | **MAY 27** (Scott Sheppard, Carnegie DTM, Topic: KBO 2013 VP113), **JUNE 24** (Henry Roe, Lowell Observatory, Topic: Pluto Before New Horizons) | 6 p.m. | **FREE**

MAY

TUE 5 | Eta Aquarid Meteor Shower Activities

(6 - 10 p.m.) Special meteor shower programs and activities

18-24 | Saturn Week

(Mon - Sun, 6 - 10 p.m.) Special Saturn programs and activities

SAT 23 | Coconino Astronomical Society Meeting

(6:45 - 8 p.m. | **FREE**) John W. Briggs (ATS, FOAH Obs., NM) will speak about "The Magnificent Solar Telescopes of George Ellery Hale"

SUN 25 | School is Out and Kids are Free

(10 a.m. - 5 p.m.) Special programs and activities; free for kids until 5 p.m.

JUNE

SAT 13 | Lowell's 4th Annual Gala: Pluto and Beyond

(Doors open 6 p.m.) Celebrate Pluto and Beyond at Lowell Observatory's 4th Annual Gala at the High Country Conference Center

JULY

11-19 | New Horizons Week

(Sat - Sun) Special programs and activities

TUE 14 | New Horizons Flyby Celebration

(10 a.m. - 10 p.m.) Special programs and activities

SAT 25 | Coconino Astronomical Society Meeting

(6:45 - 8 p.m. | **FREE**) Ken Zoll (Ex. Dir. Verde Valley Archaeology Ctr.) will speak about "Ancient Native American Astronomical Practices"

TUE 28 | Delta Aquarid Meteor Shower Activities

(6 - 10 p.m.) Special meteor shower programs and activities

For more special event information visit:

www.lowell.edu/outreach/special-events



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The Lowell Observer is published quarterly by
Lowell Observatory, 1400 W. Mars Hill Road, Flagstaff, AZ 86001
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Layout and Design by Sarah Conant
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